

# Third Five-Year Review Report

for

Hi-Mill Manufacturing Company  
Highland Township  
Oakland County, Michigan

EPA Region 5 Records Ctr.



377582

September 2010



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9-27-10

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**Hi-Mill Manufacturing Company  
Oakland County, Michigan  
Third Five-Year Review**

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## **Executive Summary**

The Hi-Mill Manufacturing Company (Hi-Mill) Superfund Site, 4.5 acres in size, is an active industrial site located in Highland Township, Oakland County, Michigan. Hi-Mill began manufacturing tubular aluminum, brass, copper tubing, and other parts in 1946. The Township, which is a suburb of Detroit, has a population of more than 19,000. Approximately 2,800 of the residents are served by community water supplies, and the remainder use private wells for their source of drinking water. In 1989, an on-site production well, used for both plant processes and drinking water, was constructed to replace the two original production wells contaminated with VOCs (volatile organic compounds). Contaminants of concern at the Hi-Mill Site are VOCs in groundwater.

The United States Environmental Protection Agency (USEPA) listed the Hi-Mill Site on the National Priorities List on February 21, 1990. A Remedial Investigation/Feasibility Study was completed for the Site from September 1988 through September 1993.

USEPA signed a Record of Decision (ROD) for the Hi-Mill Site in 1993 that called for long-term monitoring of groundwater in the shallow and intermediate aquifers and implementation of institutional controls to restrict development of the property for residential use. The Michigan Department of Environmental Quality (now known as the Michigan Department of Natural Resources and Environment, or MDNRE) did not concur with the ROD. Deed restrictions on the property are in place, and groundwater monitoring is being conducted. Since signature of the ROD in 1993, four new community wells have been installed in Highland Township. Two wells are approximately 3,000 feet west of the Site, and the other two are approximately 4,000 feet north of the Site. Subsequent to the last five-year review, two Highland Township community wells were sampled and were found not to be impacted by the Site.

The assessment of this five-year review for the Hi-Mill Manufacturing Company Site found that the remedy is protective of human health and the environment in the short term. Based on the site inspection, monitoring data and communication with operation and maintenance personnel, no inappropriate land or groundwater use was observed. USEPA is not aware of site or media uses which are inconsistent with the stated objectives of the institutional controls (ICs) for the Site. Groundwater monitoring will continue so that USEPA and MDNRE can be sure that the remedy remains protective of human health and the environment. There are some issues that impact long-term protectiveness at the Site. The groundwater monitoring program needs to be revisited and a revised sampling regimen implemented that includes the newer intermediate monitoring wells. There also remains a concern for the potential that contaminated groundwater emanating from the Site may intersect with the Wellhead Protection Area for the two community wells west of the Site in the future. As a precautionary measure, sampling of the community wells should also be performed to confirm that the Wellhead Protection Area is not impacted by the Site. In addition, long-term protectiveness at the Site requires continued compliance with use restrictions to assure that the remedy continues to function as intended. To assure proper maintenance, monitoring, and enforcement of effective ICs, long-term stewardship procedures will be reviewed and a plan developed. This plan will include a provision for regular inspection of ICs at the Site and annual certification to USEPA that the ICs are in place and effective. The institutional controls for the Site should be consistent with model restrictive covenant language. Finally, to ensure that future construction workers are protected from off-site groundwater migration into areas near Highway M-59, the adequacy

of the remedy and the ICs for the Site should be re-evaluated to determine if additional response is needed.

### **List of Acronyms**

<b>AOC</b>	Administrative Order on Consent
<b>CD</b>	Consent Decree
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act
<b>CFR</b>	Code of Federal Regulations
<b>CRA</b>	Conestoga-Rovers and Associates
<b>DNAPL</b>	Dense Non-Aqueous Phase Liquid
<b>Hi-Mill</b>	Hi-Mill Manufacturing Company
<b>ICs</b>	Institutional Controls
<b>MCL</b>	Maximum Contaminant Level
<b>MDEQ</b>	Michigan Department of Environmental Quality
<b>MDNR</b>	Michigan Department of Natural Resources
<b>MDNRE</b>	Michigan Department of Natural Resources and Environment
<b>MDOT</b>	Michigan Department of Transportation
<b>NCP</b>	National Contingency Plan
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>NPL</b>	National Priorities List
<b>O&amp;M</b>	Operation and Maintenance
<b>PAH</b>	Polyaromatic Hydrocarbon
<b>PCOR</b>	Preliminary Close-Out Report
<b>PELs</b>	Permissible Exposure Limits
<b>PRP</b>	Potentially Responsible Party
<b>RA</b>	Remedial Action
<b>RD</b>	Remedial Design
<b>RI/FS</b>	Remedial Investigation/Feasibility Study
<b>ROD</b>	Record of Decision

<b>TCE</b>	Trichloroethene
<b>ug/L</b>	Micrograms per Liter
<b>USEPA</b>	United States Environmental Protection Agency
<b>UU/UE</b>	Unlimited Use/Unrestricted Exposure
<b>VAS</b>	Vertical Aquifer Sampling
<b>VOCs</b>	Volatile Organic Compounds
<b>1,2-DCE</b>	1,2-Dichloroethene
<b>1,1,1-TCA</b>	1,1,1-Trichloroethane



### Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Hi-Mill Manufacturing Company		
EPA ID (from WasteLAN): MID043681840		
Region: 5	State: MI	City/County: Highland Township/Oakland County
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs?* <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: March 30, 1995	
Has site been put into reuse? The original facility is still in operation at the Site.		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Linda A. Kern		
Author title: Remedial Project Manager	Author affiliation: USEPA, Region 5	
Review period:** <u>January 25, 2010</u> to <u>September 2010</u>		
Date(s) of site inspection: <u>June 29, 2010</u>		
Type of review: <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion)		
Review number: <input type="checkbox"/> (first) <input type="checkbox"/> 2 (second) <input checked="" type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action: <input type="checkbox"/> Actual RA On-site Construction at OU #____ <input type="checkbox"/> Actual RA Start at OU# <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from WasteLAN): <u>September 29, 2005</u>		
Due date (five years after triggering action date): <u>September 29, 2010</u>		

\* ["OU" refers to operable unit.]

\*\* [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

**Five-Year Review Summary Form  
(continued)**

**Issues:**

- 1) The intermediate aquifer requires additional sampling to better assess current groundwater conditions at the Site.
- 2) There remains a concern for the potential that contaminated groundwater from the Site could impact the Wellhead Protection Area for two community wells west of the Site.
- 3) To ensure the ICs remain effective, IC requirements need to be evaluated and an IC Plan developed. The IC Plan should take into consideration potential construction along State Highway M-59 and impacts to future workers.
- 4) The Agencies need to determine whether any additional follow-up activities are needed to address the vapor intrusion pathway for on-site workers.

**Recommendations and Follow-up Actions:**

- 1) The groundwater monitoring program for the Site needs to be revisited and a revised sampling regimen implemented. The regimen should include the newly constructed intermediate monitoring wells at the Site.
- 2) Sampling of the community well(s) within the Wellhead Protection Area that potentially intersects the Site groundwater contamination plume needs to be conducted.
- 3) An IC evaluation for the Site needs to be completed. An IC Plan needs to be developed documenting IC activities and planning corrective measures needed to ensure long-term protectiveness.
- 4) Evaluate whether any additional follow-up activities are needed, beyond the indoor air sampling conducted by CRA in 2005, to address the vapor intrusion pathway.

**Protectiveness Statement:**

The assessment of this five-year review for the Hi-Mill Manufacturing Company Site found that the remedy is protective of human health and the environment in the short term. Based on the site inspection, monitoring data and communication with O&M personnel, no inappropriate land or groundwater use was observed. USEPA is not aware of site or media uses which are inconsistent with the stated objectives of the ICs for the Site. Groundwater monitoring will continue so that USEPA and MDNRE can be sure that the remedy remains protective of human health and the environment. There are some issues that impact long-term protectiveness at the Site. The groundwater monitoring program needs to be revisited and a revised sampling regimen implemented that includes the newer intermediate monitoring wells. There also remains a concern for the potential that contaminated groundwater emanating from the Site may intersect with the Wellhead Protection Area for the two community wells west of the Site in the future. As a precautionary measure, sampling of the community wells should also be performed to confirm that the Wellhead Protection Area is not impacted by the Site. In addition, long-term protectiveness at the Site requires continued compliance with use restrictions to assure that the remedy continues to function as intended. To assure proper maintenance, monitoring, and enforcement of effective ICs, long-term stewardship procedures will be reviewed and a plan developed. This plan will include a provision for regular inspection of ICs at the Site and annual certification to USEPA that the ICs are in place and effective. The institutional controls for the Site should be consistent with model restrictive covenant language. Finally, to ensure that future construction workers are protected from off-site groundwater migration into areas near Highway M-59, the adequacy of the remedy and the ICs for the Site should be re-evaluated to determine if additional response is needed.

**Other Comments:** None

**CERCLIS Data:**

**Date of last Regional Review of Human Exposure Indicator:** 08/11/2010

**Human Exposure Survey Status:** Current Human Exposure Controlled

**Date of last Regional Review of Groundwater Migration Indicator:** 08/11/2010

**Groundwater Migration Survey Status:** Insufficient Data to Determine Contaminated Groundwater Migration Control Status

**Ready for Reuse Determination Status:** The original facility is still in operation at the Site

**Hi-Mill Manufacturing Company  
Oakland County, Michigan  
Third Five-Year Review**

**I. Introduction**

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and identify recommendations to address them.

The United States Environmental Protection Agency (USEPA) is preparing this five-year review report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

*"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

USEPA interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

*"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."*

USEPA conducted this five-year review of the remedy implemented at the Hi-Mill Manufacturing Company (Hi-Mill) Superfund Site in Oakland County, Michigan. This review was conducted for the Site by the USEPA Remedial Project Manager from January 2010 through September 2010, with assistance from the Michigan Department of Natural Resources and Environment (MDNRE). This report documents the results of the review.

This is the third five-year review for the Hi-Mill Site. This statutory five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

## II. Site Chronology

**Table 1 - Chronology of Site Events**

Date	Event
1946	Hi-Mill Manufacturing began operation
1977	Michigan Department of Natural Resources (MDNR) issued National Pollutant Discharge Elimination System (NPDES) permit for discharging; USEPA did not concur with the permit
Between 1978 and 1980 (exact date unknown)	Underground delivery line for trichloroethene (TCE) ruptured
1983	After obtaining approval from MDNR, Hi-Mill excavated sludge from larger lagoon and backfilled it with clean fill
1988	Oakland County Health Department found volatile organic compounds (VOCs) in on-site well used for drinking and process water
June 24, 1988	Hi-Mill Site proposed to the National Priorities List (NPL)
September 23, 1988	Administrative Order on Consent (AOC) for Remedial Investigation/Feasibility Study (RI/FS) entered
February 21, 1990	Hi-Mill Site finalized on NPL
June 26, 1990	Removal assessment conducted and No Remedial Action Planned decision made
September 1988 to September 1993	RI/FS completed
September 17, 1993	Michigan Department of Environmental Quality (MDEQ) issued letter stating non-concurrence with Record of Decision (ROD)
September 28, 1993	ROD issued by USEPA
December 7, 1994	Consent Decree (CD) for Remedial Design/Remedial Action (RD/RA) entered
March 30, 1995	Preliminary Close-Out Report (PCOR) signed
June 28, 1995	RD completed
June 28, 1995	Start of on-site RA
May 17, 1996	Operation and Maintenance (O&M) began
August 25, 2000	First Five-Year Review completed
August 2000	Hi-Mill voluntarily performed a soil gas survey to define areas in which to inject oxidizing agent
July 2001	Voluntary action conducted involving injection of an oxidizing agent into shallow aquifer
September 29, 2005	Second Five-Year Review completed
June 29, 2010	Third Five-Year Review Site Inspection Conducted

### **III. Background**

#### **Physical Characteristics**

The Hi-Mill Manufacturing Company Superfund Site is located at 1704 Highland Road in Highland Township, Oakland County, Michigan (See Figures 1 and 2). The Site is approximately 4.5 acres in size and is still an operating facility. Highland Road is the local name for the section of State Highway M-59 that runs through Highland Township.

The one-mile stretch of State Highway M-59 on which the Hi-Mill Site is located is not developed. Highway M-59 demarcates the northwestern border of the Site; the other three sides of the property are adjacent to the Highland State Recreation Area. Another small portion of land across the highway from Hi-Mill is also part of the State Recreation Area. Private homes, located about 2,000 feet to the southeast, are the closest residences to the Site.

Target Pond, a marshy area approximately ten acres in size, borders the Site to the east, and Waterbury Lake lies about 1,000 feet to the south. Waterbury Lake is 35 to 40 acres in size. Both the lake and the pond are part of the Highland State Recreation Area. A culvert in a section of Target Pond close to the north parking lot of the Hi-Mill facility may direct drainage and surface water run-off from the Site. A septic field located near the former lagoon area adjacent to the east side of the plant drains into Target Pond. Alderman Lake, which is 1,000 feet northwest of the Site, receives drainage from the storm sewer located in the M-59 median. None of these areas – Target Pond, Waterbury Lake, Alderman Lake, or the Highland State Recreation Area – are considered to be environmentally sensitive.

Historical studies have indicated three aquifers are present in the area of the Site. A silty clay and clay unit appears to separate the shallow and intermediate aquifers in the immediate vicinity of the Site. However, contamination previously found in the former on-site production wells, which were screened in the intermediate aquifer, indicates that the two aquifers are hydraulically connected. Although a clay unit is also known to exist between the intermediate and deep aquifers, the layer thins out southeast of the Site and these two lower aquifers also become hydraulically connected. The hydrogeologic data collected during the RI indicated that groundwater in the shallow aquifer flowed out radially from the Site, but monitoring data from recent years indicate that the contamination in the shallow aquifer is migrating toward the west. Generally, flow in the intermediate aquifer is to the west, and flow in the deep aquifer is to the southwest. The closest community wells, screened in the deep aquifer, are 3,000 feet west of the Site.

#### **Land and Resource Use**

Highland Township is a charter township with a population of 20,231 residents (per the 2008 Census Bureau Estimate). It is located in Oakland County, approximately 30 miles northwest of Detroit. The Township covers approximately 36 square miles, of which slightly over 6% is comprised of lakes and other surface water bodies. Nearly one-fourth of the land in Highland Township is owned by the State of Michigan as part of the Highland State Recreation Area.

The land at the Site is currently zoned industrial and is surrounded on three sides by the State Recreation Area. Township officials anticipate that the land at the Site will continue to

be used as an industrial parcel. In a land inventory conducted by MDNR in 2004, the Hi-Mill land was not identified as a property the State would currently be interested in obtaining.

The risk assessment for the Hi-Mill Site evaluated a number of different future land use scenarios. The pathways of greatest concern were listed as inhalation of, ingestion of, or direct contact with water from the shallow groundwater unit. Excess lifetime cancer risks were determined to be  $4 \times 10^{-3}$  for adults and  $3 \times 10^{-4}$  for children. The hazard index for future on-site adult residents ingesting or having direct contact with shallow groundwater was calculated to be 37. The hazard index for future on-site child residents based on ingesting shallow groundwater was calculated to be 20. At the time the risk assessment for the Hi-Mill Site was prepared, a future residential scenario and use of groundwater for drinking were not considered to be likely. Also, because the closest private drinking water wells were not in the direction of groundwater flow, this pathway was not evaluated as part of the risk assessment.

For the foreseeable future, it is likely that the Hi-Mill property will continue to be used for industrial purposes. Since 1995, however, Highland Township officials have been working to promote development. Although increased development in the Township may not mean the zoning of the Hi-Mill Site will immediately change, the potential exists for future development to result in the installation of underground sewer lines along the Highway M-59 corridor, which runs adjacent to the Hi-Mill facility. The potential exists for future drilling of additional community wells, which may result in an increased pumping and drawdown of existing community wells.

The rates of development in nearby communities, such as White Lake Township, Hartland Township, and Waterford, have thus far been greater than in Highland, due, in part, to their existing municipal infrastructure such as sanitary sewers and central water systems. Between 1990 and 2000, the township to the west of Highland experienced a 60% increase in population. Lack of a centralized municipal sewer system causes Highland Township to be subject to a number of limits on development density that Oakland County imposes on areas with parcel-by-parcel sewage disposal. Until recently, this lack of infrastructure has led developers to show a preference for building in the adjoining townships. Once the Township started working with residential developers in 1995, however, progress has been made in establishing the core of a municipal water system. A number of new subdivisions have been constructed or are in the planning stages in the area. In addition, a Sanitary Sewer Master Plan for the Township was finalized in April 2004, although the timing of the sewer construction will depend heavily on obtaining future State funding.

Since 1994, five new community wells have been constructed in the Township. These were the first community wells installed since the late 1970s. The four pre-existing community wells that were installed in 1973 and 1978 are located at a significant distance from the Site. In 1994, a new well was constructed three-quarters of a mile north of the facility. The water from this well, however, contained high iron and was taken out of operation. In 1996, a pair of community wells (Huntwood Place Wells #1 and #2) were installed in the deep aquifer, at a depth of approximately 175 feet, 4,000 feet northeast of the Hi-Mill Site. The Huntwood Wells serve over 1,463 residents.

Two additional community wells, referred to as Highland Valley Wells #1 and #2, were installed in 1998. These two wells, screened in the deep aquifer at a depth of approximately 240 feet, are located 3,000 feet to the west of the Hi-Mill Site and are of greater concern

than the Huntwood Wells because groundwater in the intermediate aquifer flows to the west. Together with another pair of wells, the Highland Valley wells serve over 1,308 residents.

## **History of Contamination**

Hi-Mill Manufacturing Company began operating at its current location in 1946. Hi-Mill began using trichloroethene at the plant in 1951. Since it was established, the plant has manufactured aluminum, brass, and copper tubing parts and fittings, mainly for the refrigeration industry. Raw materials are first machined and cut, and then the tubing forms are shaped and soldered to form the final product. As of 1992, all soldering operations used silver solder or aluminum bar brazing. However, tin-lead solder may have been used in prior operations. Anodizing or "pickling" was done to brighten the parts. Manufacturing processes included the use of nitric and sulfuric acid for brightening solutions, chromic acid for parts washing, caustic soda for neutralizing non-recycled process waters, and chlorinated solvents for degreasing.

Before shipping completed tubing components, the parts were degreased by placing them in mesh containers and immersing the containers into TCE degreasing units. The parts were placed under heat lamps to remove any residual solvent. Any solvents volatilizing from the heating process or the degreasing unit were vented to the outside air. The chlorinated solvents used to degrease the fabricated parts are the source of contamination in on-site and off-site groundwater. Currently, these chlorinated VOCs, and in particular TCE, are the primary contaminants of concern at the Hi-Mill Site.

One known release of TCE was from a rupture of an underground solvent delivery system in the plant. The length of time the pipes were leaking and the total volume of solvent released are not known. Other potential sources of hazardous contaminants that existed at the Site included the following: two concrete, 1,600-gallon underground wastewater storage tanks; one 10,000-gallon fuel tank; a drum storage area; four 500-gallon aboveground TCE storage tanks; one 250-gallon aboveground TCE storage tank; three 500-gallon TCE degreasers; one 1,000-gallon TCE aboveground storage tank; acid-brightening baths; and several hundred feet of underground piping system used to distribute TCE throughout the plant.

Inorganic contamination was what initially brought the Site to the attention of MDNR, now known as MDNRE. From 1946 to 1979, wastewater tanks from acid brightening baths were regularly emptied into a lagoon east of the plant. The lagoon was about 10 feet deep, 100 feet long and 100 feet wide. The method of disposal for waste chlorinated solvents during this time period is not known.

In 1972, prompted by complaints from Hi-Mill employees to MDNR, the two on-site production wells and Target Pond were sampled for inorganic compounds. Water from one well and samples from Target Pond were found to contain elevated levels of metals. In 1976, MDNR resampled the production wells and the pond. Analysis indicated that only the samples from Target Pond showed elevated metals to be present.

In 1976, Hi-Mill built a second, smaller lagoon south of the original one. This second lagoon was designed to receive overflow from the original lagoon. On two occasions in 1976 and 1977, waste in the larger lagoon overflowed into Target Pond. After the overflow came to the attention of USEPA, Hi-Mill applied for a NPDES permit. At that time, MDNR ordered Hi-Mill to stop discharging the untreated wastewater into the lagoon and required Hi-Mill to design a wastewater recycling and treatment program. The wastewater recycling program

was used between 1981 and 1988. At that time, Hi-Mill reportedly ceased all activities that generated wastewater containing metals.

As part of the 1978 construction of the fourth addition to the plant, a concrete floor was installed over solvent delivery lines connecting degreaser tanks to TCE storage tank(s). In August 1981, the rate at which the TCE containers had to be refilled caused plant personnel to report that the underground delivery line might be damaged. It is not known whether this was the first rupture in the lines or if more minor leaks had been present prior to 1981. Based on the appearance of the concrete floor, it appears that an approximate 8-inch wide section was removed along at least part of the length of the solvent delivery system so that the damaged piping could be dismantled and taken out. The width of the concrete patching currently in place indicates that a significant volume of soil could not have been removed. According to a letter from the potentially responsible party (PRP) dated March 4, 1998, the underground piping near the southeast end of the building, as well as the underground feeder lines to various former degreaser locations, are still in place. No soil samples were collected.

In 1946, Hi-Mill Manufacturing purchased the gas station located across the then two-lane Highway M-59 for use as a storage facility. Sampling near the former gas station showed contaminants such as toluene and polyaromatic hydrocarbons (PAHs) to be present.

### **Initial Response**

Removal of the piping for the underground piping, described above, was the first response taken by Hi-Mill to address Site contamination. No regulatory agencies were present during the work. Between 1981 and 1983, Hi-Mill attempted to alleviate the overflow problems in the larger of the two lagoons by spraying waste liquid from the lagoon into the air. Spray nozzles were mounted on top of the production facility and along portions of the facility's 8-foot high fence. When MDNR learned of the practice in 1983, they ordered Hi-Mill to cease the activity and to begin excavation and cleanup of the lagoon. Under MDNR oversight, Hi-Mill removed and disposed 142 cubic yards of contaminated soil, 34,400 gallons of contaminated sludge, and 63,300 gallons of contaminated wastewater. Soils along the sides of the lagoon as well as a one-foot layer of clay from the bottom of the lagoon were also excavated.

After receiving complaints about the drinking water at the plant, the Oakland County Health Department resampled the two on-site production wells. TCE and 1,2-dichloroethylene (1,2-DCE) were detected in the water. Bottled water was supplied to the employees, and in 1989, a new well was installed.

### **Basis for Taking Action**

Hazardous substances that have been released into groundwater and soil at the Hi-Mill Site and into Target Pond include aluminum, barium, chromium, copper, nickel, silver, and zinc. In addition, the following VOCs have also been released from the Site: 1,1,1-trichloroethane (1,1,1-TCA); 1,1,2-trichloroethane; 1,2-DCE; 1,1-dichloroethene; 1,1-dichloroethane; tetrachloroethene; TCE; vinyl chloride; ethylbenzene; chlorobenzene; benzene; xylenes; and toluene. A number of PAHs and phthalates were also detected in groundwater. The three VOCs detected at the highest concentrations in groundwater during the RI were 1,1,1-TCA; 1,2-DCE; and TCE. The contaminant of most concern currently, due to the high concentrations being detected in groundwater, is TCE.



During the RI, elevated metals were detected in Target Pond sediments and in on-site soil. The ecological assessment that was conducted determined that the pond was not being adversely affected by the metals. Sediments from Target Pond were not analyzed for VOCs or other organic compounds.

The risk assessment for the Site evaluated two exposure pathways: potential risk to current on-site workers due to ingestion of surface soil, and risks posed to future on-site residents due to ingestion of shallow groundwater, dermal contact with shallow groundwater and Site soil, ingestion of soil, inhalation, and ingestion of garden vegetables. The exposure pathways determined to be of primary concern were ingestion of and dermal contact with shallow groundwater. Evaluation of the potential exposure showed that an adult resident drinking groundwater from the shallow aquifer would be exposed to an excess lifetime cancer risk of  $4 \times 10^{-3}$ . For children, this number was  $3 \times 10^{-4}$ . The hazard index for future on-site adult residents ingesting or having direct contact with shallow groundwater was calculated to be 37. The hazard index for a child residing on the Site in the future and ingesting shallow groundwater was calculated to be 20.

The exposure pathway evaluated in the risk assessment for on-site workers was the ingestion of on-site surface soils. The assessment indicated that current on-site workers were not at risk via this pathway. Current worker exposure to Site groundwater was not evaluated because there was no indication that workers were exposed to the shallow groundwater at the Site. The vapor intrusion pathway was not evaluated in the risk assessment.

Because the possibility of future residential development at the Site was unlikely and because no risk was found to on-site workers, no active remediation of the Site was required when the ROD was signed in 1993. Since that time, however, the installation of community wells near the Hi-Mill Site and the potential overlap of the Wellhead Protection Area for two of the wells with the groundwater plume emanating from Hi-Mill introduce new target populations that could potentially be at risk. While current data show that only groundwater in the shallow aquifer is contaminated, the presence of VOCs in samples collected in the 1980s from the two on-site production wells that existed at the time, screened in the intermediate aquifer, indicates that the shallow and intermediate aquifers are connected.

Another development at the Site since the risk assessment was prepared is that the Michigan Department of Transportation (MDOT) has preliminary plans to construct a municipal sewer system along Highway M-59. The depth to the groundwater contamination from Hi-Mill in the highway median is similar to the typical depth at which interceptor sewers are constructed. If construction of the sewer system takes place in the future, this could introduce a possible exposure pathway to off-site workers that was not evaluated during the Site's original risk assessment.

#### **IV. Remedial Actions**

##### **Remedy Selection**

The Record of Decision (ROD) for the Hi-Mill Site was signed by USEPA on September 28, 1993. The remedy selected in the ROD called for "No Action with Groundwater Monitoring and Institutional Controls" and consisted of the following main components:

- Long-term (thirty years) groundwater monitoring of the shallow groundwater unit and intermediate aquifer for VOCs (TCE, 1,2-DCE and vinyl chloride).
- Long-term (thirty years) monitoring of the shallow groundwater unit near nearby surface water bodies for the same constituents which are monitored for in the groundwater.
- Quarterly monitoring of the groundwater for the first three years, after which consideration will be given to reducing the sampling frequency to annually.
- Implementation of institutional controls to restrict development of the Hi-Mill property for residential use.

The decision in the ROD was based, in part, on the findings that (1) the contaminated shallow groundwater unit is not being used as a potable water source and cannot be used as one in the future due to its low water yield, so there are no beneficial uses for the shallow groundwater unit, and (2) the intermediate aquifer, which does supply potable water, showed no signs of contamination. The ROD further states, *"If, however, the analytical results generated as a result of monitoring groundwater indicate the presence of contaminants above health based levels in the intermediate aquifer, a groundwater treatment system will be evaluated"* (1993 ROD, Declaration section). The ROD states that the monitoring system would be designed to detect adverse impacts to the intermediate aquifer as well as potential impacts to nearby surface water bodies, and states that if USEPA determines, based on the results of long-term monitoring, *"that there are unacceptable impacts, ... a treatment system will be evaluated"* (1993 ROD, p.4).

The Statement of Work attached to the 1994 Consent Decree states that if additional information indicates that the groundwater monitoring program is inadequate, USEPA may require that additional groundwater monitoring wells be installed and/or additional parameters be analyzed. Such "additional information" might include changes in contaminant characteristics and increases in the contaminant concentrations in groundwater.

The Final Response Design Plan, dated March 1995, outlined the objectives and rationale of the design and presented proposed locations for monitoring wells, staff gauges and piezometers. Monitoring program requirements were also defined in the Final Response Design Plan. The Response Design Plan stated that sampling of surface water bodies would occur if USEPA determined it was necessary based on groundwater monitoring results.

The design objectives outlined in the Response Design Plan were to minimize environmental and health impacts. The design rationale for the monitoring program was *"to conduct monitoring at strategic locations to detect any changes to the environmental conditions at the site that may adversely impact public health or the environment."*

### **Remedy Implementation**

A federal Consent Decree for completion of the RD/RA was entered on December 7, 1994. The parties to the CD were Robert and Richard Beard and the Hi-Mill Manufacturing Company. Robert Beard, the surviving owner/operator of Hi-Mill, recently passed away, during the summer of 2009. The status of the company is pending at the current time.

Institutional controls (ICs) required by the ROD were implemented on December 22, 1994. USEPA signed a PCOR for the Site on March 30, 1995. On June 28, 1995, RD was completed and the RA began.

On-site construction consisted of installing monitoring wells, staff gauges and piezometers. A fence surrounding the property was already in place. Construction activities were completed on September 21, 1995, and groundwater monitoring began on May 17, 1996.

## **Institutional Controls**

Institutional controls are required to ensure the protectiveness of the remedy. ICs are non-engineered instruments, such as administrative and/or legal controls, that help minimize the potential for exposure to contamination and protect the integrity of the remedy. Compliance with ICs is required to assure long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure (UU/UE).

One component of the selected remedy for the Hi-Mill Site was to implement institutional controls "to restrict development of the Hi-Mill property for residential use." These restrictions were placed on the property deed on December 22, 1994, fifteen days after the Consent Decree was entered in court.

The recorded document (a copy of which is provided in Attachment 1) contains the following language:

*The following restrictions are imposed upon the Site, its present and any future owners, their authorized agents, assigns, employees or persons acting under their direction or control, for the purposes of protecting public health or welfare and the environment, preventing interference with the performance, and the maintenance, of any response actions selected and/or undertaken by the United States Environmental Protection Agency (USEPA), or any party acting as agent for USEPA, pursuant to Section 104 of ...CERCLA. Specifically, the following deed restrictions shall apply to the Site as provided for in paragraph nine (9) of the Consent Decree:*

- 1. There shall be no consumptive or other use of the shallow groundwater unit underlying the Site that could cause exposure of humans or animals to the shallow groundwater unit underlying the Site;*
- 2. There shall be no residential or agricultural use of the Site, including, but not limited to, any installation of drinking water production wells in the shallow groundwater unit, except as approved by USEPA. Further, there shall be no excavation beneath the paved parking areas at the Site;*
- 3. There shall be no tampering with, or removal of, the containment or monitoring systems that remain on the Site as a result of implementation of any response action by USEPA, or any party acting as agent for USEPA, and which is selected and/or undertaken by USEPA pursuant to Section 104 of CERCLA; and*
- 4. There shall be no use of, or activity at, the Site that may interfere with, damage, or otherwise impair the effectiveness of any response action (or component thereof) selected and/or undertaken by USEPA, pursuant to*

*Section 104 of CERCLA, except with written approval of USEPA, and consistent with all statutory and regulatory requirements.*

The recorded restrictions also state:

*"The above use restrictions are intended for the protection of public health and the environment and may therefore be enforced by the USEPA or the State of Michigan. The obligation to implement and maintain the above restrictions shall run with the land and shall remain in effect permanently, unless and until such time as USEPA determines there is no longer contamination on the Site."*

Given that Robert Beard, now deceased, was the signatory to the CD, USEPA is evaluating the enforceability of the current deed restrictions to ensure that they will provide the protectiveness intended by the ROD. If necessary, USEPA will request that the company implement new ICs for the Site that will be consistent with model restrictive covenant language that EPA, MDNRE and the Office of the Michigan Attorney General have developed.

Currently, there are no use restrictions beyond the property boundaries. This is a concern because the potential exists for future installation of a municipal sewer system that would run below ground level along Highway M-59. Although the shoulder of the highway, where the lines may be installed, is at a higher elevation than the median, the depth to the groundwater contamination in the location of the median is fairly close to the typical depth at which interceptor sewers are constructed. This could introduce exposure pathways to off-site workers that were not evaluated during the Site's risk assessment.

#### Status of ICs and Follow-up Actions Required

The following table summarizes institutional controls for areas that do not support UU/UE at the Site:

**Table 2 – Institutional Controls Summary Table**

<b>Media, Engineered Controls, and Areas that do not support UU/UE Based on Current Conditions</b>	<b>IC Objectives and Restrictions</b>	<b>Title of IC Instrument Implemented</b>	<b>Required as part of the remedy?</b>
On-site soils and ground water	Restrict residential development and use of ground water.	Deed Restriction implemented December 1994	Yes
Off-site groundwater	No restrictions for off-site areas were required by the ROD; the need for such restrictions is currently under review for areas such as the M-59 median.	Under review	No

*Current compliance:* Based on the site inspection, monitoring data, and communication with O&M personnel, no inappropriate land or groundwater use was observed. The restrictions recorded following entering of the Consent Decree are currently in place. USEPA is not aware of site or media uses which are inconsistent with the stated objectives of the ICs. If USEPA determines, after evaluating the enforceability of the current deed restrictions, that a new restrictive covenant is needed to ensure the protectiveness intended by the ROD, USEPA will work with the PRP to implement a new restrictive covenant, consistent with model restrictive covenant language, to strengthen the use controls at the Site.

*Long-Term Stewardship:* Long-term protectiveness at the Site requires continued compliance with use restrictions to assure that the remedy continues to function as intended. To assure proper maintenance, monitoring, and enforcement of effective ICs, long-term stewardship procedures will be reviewed. ICs should be inspected regularly and annual certification should be provided to USEPA that shows that the required ICs are in place and effective. Additionally, development of an IC to address the issues associated with future construction in the median of Highway M-59 should be pursued.

### **System Operations/Operation and Maintenance**

Originally, the monitoring program for the Hi-Mill Site included quarterly monitoring of sixteen wells in the shallow aquifer and seven wells in the intermediate aquifer. Groundwater samples were, and are currently, analyzed for VOCs only. In July 2000, USEPA approved a reduced monitoring program for the Site. The reduced monitoring program required that all wells be sampled on an annual basis, with selected shallow wells sampled semi-annually and two shallow wells sampled quarterly.

As a result of this five-year review, the need for modifications to the monitoring program for the Site has been identified and will be discussed in more detail later in this report. Preliminary discussions have taken place between USEPA, MDNRE and the contractors for Hi-Mill to modify the monitoring program for the Site to ensure continued protection. Initial discussions took place over the past several years, but no formal changes to the monitoring program resulted. It is anticipated that, as a follow-up to this five-year review, discussions will continue in order to better refine the sampling regimen for the Site to ensure that resources are more efficiently utilized, while ensuring protectiveness of the Site.

### **O&M Costs**

Annual O&M costs projected in the ROD for the selected remedy at the Hi-Mill Site were \$88,000 per year for the first three years of monitoring and \$23,000 per year thereafter. Actual costs for the ongoing O&M work conducted by the contractor for the PRP are not available for evaluation.

## **V. Progress Since the Last Five-Year Review**

The Second Five-Year Review Report for the Hi-Mill Site was completed on September 29, 2005. The 2005 five-year review recommended that, in order to determine whether the remedy was protective in the short term, the Highland Township community wells needed to be sampled to confirm that short-term protectiveness was in place. Since that time, the wells were sampled and found not to be impacted by the Site. Subsequently, USEPA concluded that the remedy was protective in the short term. The five-year review also made

several other recommendations to ensure long-term protectiveness. These issues, as well as follow-up actions that have been taken, are itemized in Table 3 below.

**Table 3 – Status of Issues Identified in Previous Five-Year Review**

<b>Issues from Previous Review</b>	<b>Recommendations/ Follow-Up Actions</b>	<b>Party Responsible</b>	<b>Action Taken and Outcome</b>	<b>Date of Action</b>
Lack of ICs to prevent potential direct contact pathway for workers who might be excavating soil in the median of or along the highway where the plume has migrated. Also, questions as to whether existing deed restrictions are effective and will be legally binding and enforceable.	Develop an IC Study Plan to:  (1) Identify preferred options for restricting excavation work along M-59 in the area of the plume; and  (2) Evaluate adequacy and enforceability of deed restrictions currently in place on the Site property.	PRP with oversight by MDNRE and USEPA	(1) Following consultation with Michigan Department of Transportation, USEPA informed Hi-Mill that applying ICs on MDOT property would require submittal of Form 2205, which covers use of MDOT right-of-ways.  Hi-Mill contractors reviewed the as-built construction drawings of the section of M-59 in the immediate vicinity of the Site.  (2) Evaluation of ICs is underway.	December 3, 2007  July 2008; additional PRP action is pending  On-going
Potential threat to community wells due to:  (1) Intersection of the Wellhead Protection Area for the wells with contaminated groundwater from the Site;  (2) Presence of on-site dense non-aqueous phase liquid (DNAPL), which could act as a continuing source of groundwater contamination; and  (3) Significantly increased concentrations of TCE both on- and off-site since RI.	(1) Sample municipal well(s) within Wellhead Protection Areas that potentially intersect the Site groundwater plume;  (2) Within three months after receipt of data from municipal well sampling, identify any additional work that needs to be done so that the Agencies have sufficient information to determine further actions that need to be taken; and  (3) Evaluate adequacy of sampling frequency and monitoring well network.	(1) PRP  (2) USEPA  (3) USEPA	(1) USEPA sampled the Highland Valley Wellhead utilizing its ESAT contractor.  (2) Analytical results of the municipal well sampling did not identify any contamination that required further action at the time.  (3) Hi-Mill installed Vertical Aquifer Sampling (VAS) boreholes to determine the locations/installation details for new monitoring well placement;  New monitoring wells (IW-10, IW-11, and IW-12) and replacement monitoring well (SW-27R) were installed; and  The new wells were subsequently sampled.  Discussions have taken place between the Agencies and Hi-Mill regarding modifying the sampling program for the Site, but no changes have been made to date.	April 2006  April 2006  February 2008  June 2008  July 2008  Discussions concerning the sampling program are ongoing

As indicated in Table 3 above, in addition to groundwater monitoring, additional response actions were conducted at the Site as follow-up to the 2005 Five-Year Review. These tasks are described in more detail below.

#### Vertical Aquifer Sampling

VAS boreholes were installed at the Site during February 2008. Soil and groundwater samples were collected from each of the VAS boreholes in accordance with the approved Additional Response Actions Work Plan. The analytical results for the soil samples were used to determine the locations and installation details for the new intermediate monitoring wells (IW-10, IW-11, and IW-12), as required by the Work Plan.

#### New Monitoring Wells

New monitoring wells (IW-10, IW-11, and IW-12) and replacement monitoring well SW-27R were installed during June 2008. The design of each of these wells was based on the stratigraphic and VAS sample results derived from the VAS boreholes, in consultation with USEPA and MDNRE. The new monitoring wells were sampled in July 2008, but have not been sampled in subsequent sampling events.

### **VI. Five-Year Review Process**

#### **Administrative Components**

USEPA has conducted this review of the remedial actions implemented at the Hi-Mill Site in Oakland County, Michigan. The preparation of the five-year review was led by Linda Kern, USEPA Remedial Project Manager, with assistance and review provided by MDNRE Project Manager Autumn Lawson, Daria Devantier, Superfund Unit Chief, and Bill Bolio, Hydrogeologist. Robert Paulson, USEPA Community Involvement Coordinator, provided community outreach support. The five-year review consisted of a review of relevant Site documents and monitoring data, as well as discussions with MDNRE and technical representatives of Hi-Mill. In addition, a site inspection was performed on June 29, 2010, to evaluate current Site conditions.

#### **Community Notification and Involvement**

Activities to involve the community in the five-year review were initiated with a public notice prepared by USEPA and placed in the Oakland Press newspaper on February 25, 2010, announcing that a five-year review was to be performed for the Site. The notice provided members of the public with general Site information, references to USEPA's website, the location of the Site information repository, names and contact information for the Site, and an opportunity to request additional information from USEPA. Following the publication of the public notice there was one inquiry from the public concerning the Site activities and performance of the five-year review. Community interviews were not conducted due to low community interest. A copy of the public notice is included in Attachment 2.

## **Document and Data Review**

The five-year review consisted of a review of relevant site-specific documents including the RI, Risk Assessment, ROD, investigatory reports, correspondence, O&M records and monitoring data generated to date.

TCE is currently the main contaminant of concern at the Hi-Mill Site. Since O&M began, TCE has been detected in on-site shallow monitoring well SW-1 at a concentration of up to 240,000 micrograms per liter (ug/L). During Phase I of the RI, conducted from 1989 to 1990, the highest level of TCE in on-site groundwater was 1,100 ug/L. During Phase II of the RI in 1992, the highest level of TCE found on-site was 6,700 ug/L. As was discussed in the 2005 Five-Year Review Report, the result of 240,000 ug/L is more than 35 times greater than the concentration of 6,700 ug/L detected during the RI.

The 2005 Five-Year Review Report also discussed the fact that, since O&M began at the Site, VOCs had not been detected at higher than trace levels in the seven then-existing monitoring wells screened in the intermediate aquifer. Prior to the RI, however, concentrations of TCE at levels above the drinking water maximum contaminant level (MCL) had been detected in the two on-site drinking water/production wells, both of which were screened in the intermediate aquifer (and later closed).

As part of the 2005 Five-Year Review, the locations of the screens for the intermediate monitoring wells were evaluated based on a review of RI groundwater data from hand auger borings and monitoring wells, O&M data, and a review of on- and off-site stratigraphy. The review concluded that it was likely that the then-existing well network for monitoring the intermediate aquifer may not have been intercepting the flow path of contamination in this aquifer. Thus, as a result of the five-year review, additional response action was taken by Hi-Mill. Seven Vertical Aquifer Sampling boreholes (VAS-1 to VAS-7) were installed during the period from February 18 to February 25, 2008. Soil and groundwater samples were collected from each of the VAS boreholes in accordance with the Site's approved Additional Response Actions Work Plan. The data collected from that response were used to determine the locations and installation details for the three new intermediate monitoring wells (IW-10, IW-11, and IW-12), as required by the Work Plan.

The new monitoring wells (IW-10, IW-11, and IW-12) and a replacement shallow monitoring well (SW-27R) were installed during the period from June 9 to June 12, 2008. The design of each of the wells was based on the stratigraphic and VAS sample results derived from the VAS boreholes, in consultation with USEPA and MDNRE.

Based on the evaluation of the Site in the 2005 Five-Year Review, USEPA and MDNRE had identified the need for additional monitoring wells since there is continuing VOC contamination due to historical releases from former TCE storage tanks on the property and from ruptures in underground piping used to distribute TCE throughout the plant. The two primary storage tank releases were reportedly from the 250-gallon tank formerly located on the plant's northeast side and the 1,000-gallon tank formerly located on the plant's southwest side. Over the years the plant has been operating, other industrial chemicals have been stored at the plant that potentially could have served as sources of contamination. On-site chemical storage included two concrete 1,600-gallon underground wastewater storage tanks, one 10,000-gallon fuel tank, a drum storage area, four 500-gallon aboveground TCE storage tanks, one 250-gallon aboveground TCE storage tank, three 500-gallon TCE degreasers, one 1,000-gallon TCE aboveground storage tank, acid-brightening



baths, and several hundred feet of an underground piping system used to distribute TCE throughout the plant. As a result, an unknown volume of chlorinated solvents is believed to remain beneath the Hi-Mill building.

The additional response actions described above (installation of the one replacement and three new monitoring wells) were taken to address the former lack of optimally-placed monitoring locations. However, since their installation, the new wells have been sampled only once. It is recommended that these wells be included in the routine groundwater monitoring program. This data will provide additional information about the condition of the groundwater, particularly the intermediate aquifer, and will help ensure long-term protectiveness of the remedy.

The analytical results presented in the Thirteen-Year Evaluation Report (August 2007-July 2008) indicated that shallow groundwater contamination remains evident in the immediate area of the Site building and northwest of the buildings beneath Highway M-59. Concentrations of TCE are generally around 15,000 ug/L in well SW-24 (located in the median of M-59). Analytical results obtained from the three intermediate wells installed in 2008 (IW-10, IW-11, and IW-12) revealed one trace detection of TCE at a concentration of 0.29J ug/L (estimated value) in IW-12. The duplicate groundwater sample collected from that location did not confirm the trace detection of TCE. The newer wells (IW-10, IW-11, and IW-12) have been sampled only once since their installation; therefore, future sampling of these wells is being recommended, as mentioned above, to provide additional information about groundwater conditions in the intermediate aquifer.

### **Site Inspection**

A site inspection was conducted on June 29, 2010. The inspection was performed by Linda Kern, USEPA Remedial Project Manager, Autumn Lawson, MDNRE Project Manager, and Bill Bolio, MDNRE hydrogeologist. Jim Clark, representing Hi-Mill, provided agency personnel a tour of the on-site facilities.

The purpose of the inspection was to evaluate current Site conditions and assess the protectiveness of the remedial components. Inspected areas included the operating facility, groundwater monitoring locations, and off-site areas. The condition of the Site security fence and areas along Highway M-59 were also inspected.

The following conditions were noted:

- The need for proper identification/location of all monitoring wells at the Site was identified. While Agency personnel were able to locate a majority of the monitoring locations, several locations were unable to be located based on maps provided in the Site's Operation and Maintenance Reports.
- Minor repairs are needed on several monitoring wells to ensure that they are properly secured.
- There is a need for the development of one comprehensive spreadsheet of all monitoring locations along with construction details (i.e., maps, well specifics, GPS coordinates, status of wells, etc.)

- There is a need for advance notification to the Agencies of projected sampling dates so that USEPA and/or MDNRE personnel may accompany sampling crews to observe sampling activities.

Since Hi-Mill's technical contractor was unable to participate in the site inspection, a follow-up conference call took place on July 9, 2010, to discuss the findings of the inspection. Participants on the call included Linda Kern, Autumn Lawson, Bill Bolio, and Jamie Puskas (of Conestoga-Rovers and Associates, or CRA) on behalf of Hi-Mill. In addition to the items noted above, additional discussions during the call focused on potential modifications to the sampling regimen for the Site. The parties agreed that additional discussions are needed regarding optimization of the sampling protocol for the Site.

A copy of the June 29, 2010, Site Inspection Report, along with Site photographs, is included in Attachment 3.

## **Interviews**

Prior to the site inspection, USEPA and MDNRE discussed the current conditions of the Site with Jim Clark, representing Hi-Mill. Mr. Clark provided an overview of the current Site operations and provided a tour of the on-site facility. Mr. Clark recommended that specific technical discussions concerning the Site continue with Hi-Mill's technical contractor, Jamie Puskas of CRA.

Community interviews were not conducted due to low community interest; however, MDNRE and USEPA project staff are available in the event of future inquiries.

## **VII. Technical Assessment**

### **Question A: Is the remedy functioning as intended by the decision documents?**

Yes. The intent of the remedy selected in the 1993 ROD was to continue to monitor groundwater in the shallow and intermediate aquifers to ensure no adverse impacts to human health and the environment, and to implement institutional controls to restrict future residential development of the Hi-Mill property to prevent unacceptable exposures. The selected remedy is functioning as intended by the ROD. The review of site-specific documentation, O&M data, and the results of the site inspection indicate that the remedy is currently providing adequate protection of human health and the environment. As discussed in more detail later in this report, some issues need to be addressed to ensure long-term protectiveness, including revising the groundwater monitoring program. The newly installed wells (IW-10, IW-11, and IW-12), which have been sampled only once since their installation, should be included in the routine monitoring program. In addition, downgradient community supply wells should be sampled to provide continued assurance that they are not impacted by the Site.

### **Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?**

No. Some of the exposure assumptions used at the time of the remedy selection have changed. Since the ROD was signed, there have been some developments at the Site that may introduce new potential exposure pathways and/or impact exposure assumptions that need to be evaluated.

Changes in Standards and To-Be-Considered Requirements – There have been no changes in the applicable or relevant appropriate requirements that were established for the Site; there are no new standards or to be considered requirements that would affect the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics – At the time the risk assessment for the Hi-Mill Site was completed, the probability that the property would be developed for residential use and the shallow aquifer used as a source of drinking water was considered to be low. The Site is not currently residential, nor is it expected to become residential in the near future. However, installation of several community water supply wells that have the potential to draw groundwater contaminated by the Hi-Mill Site toward them indicates that ingestion of Site groundwater is more likely than it was at the time the ROD was signed.

A second exposure pathway that was not considered during the risk assessment and that is not being addressed by current institutional controls (or by other means) relates to off-site construction workers who may be involved in excavation work along Highway M-59. In this scenario, workers could potentially come into dermal contact with contaminated groundwater.

A third exposure pathway that was not evaluated in the risk assessment is the vapor intrusion pathway. In May 2005, CRA conducted air sampling at the Hi-Mill Manufacturing facility to assess potential employee exposures to TCE and vinyl chloride, and to determine the facility's compliance with Permissible Exposure Limits (PELs) for TCE and vinyl chloride established by the Michigan Occupational Safety and Health Administration. CRA submitted the results to USEPA in a letter report dated June 28, 2005. Vinyl chloride was below the detection limit at all of the sampling locations, but there were detections of TCE at 7 of the 11 indoor sampling locations. None of the air samples collected for TCE and vinyl chloride were above their respective PELs. The Agencies need to determine whether any additional follow-up activities are needed to address the vapor intrusion pathway.

No changes in toxicity data for contaminants from the Hi-Mill Site have occurred. The ROD did not specify cleanup levels.

**Question C: Has any other information come to light that could call into question the protectiveness of the remedy?**

Yes. As discussed in the previous five-year review, concentrations of TCE both on-site and off-site have greatly increased since the time of the RI. In addition, the presence of a DNAPL in an on-site monitoring well has been confirmed. The combination of these two factors could impact the assumptions in the Site's original risk assessment.

In addition, as previously noted, several community water supply wells have been put into use near the Hi-Mill Site since the time the ROD was written. Additional groundwater monitoring needs to be conducted to provide continued assurance that the Hi-Mill groundwater contamination plume has had no impact to the Wellhead Protection Area estimated for two of the new community wells.

## Technical Assessment Summary

Since the ROD for the Hi-Mill Site was signed in 1993, several situations have arisen that indicate that the Site's remedy should be closely monitored. Two of the four issues relate to the introduction of two new potential exposure pathways. Another issue is the change in contaminant levels both on- and off-site since the RI. The last issue relates to the identification of a principal threat, in the form of a DNAPL, on the Site.

The original risk assessment for the Site, conducted prior to the issuance of the ROD, evaluated two exposure pathways: (1) the potential risk to current on-site workers due to ingestion of surface soil; and (2) the risks posed to future on-site residents due to ingestion of shallow groundwater, dermal contact with shallow groundwater and Site soil, ingestion of soil, inhalation, and ingestion of garden vegetables. In the risk assessment, the exposure pathways determined to be of primary concern were ingestion of and dermal contact with shallow groundwater. Based on the information available at the time of the ROD, it was determined that it was unlikely that the shallow groundwater would be used for a drinking water source.

With respect to potential new exposure pathways, community wells have been installed since the ROD was signed. The installation of these wells has increased drawdown of groundwater in the area downgradient of the Site. This could potentially have an impact on the leading edge of the contaminated off-site groundwater plume. The possible overlap of the groundwater plume from Hi-Mill and the hydraulic capture zone for two of the operating municipal wells indicates that this pathway should be closely monitored. Available sample results indicate that the intermediate aquifer is not currently impacted, as only trace levels of TCE have been detected, and sample results from the community wells located west of the site showed no detections. While adverse impact to the community wells does not seem likely in the near term, inclusion of the newer intermediate wells as part of the routine groundwater monitoring program, in addition to additional sampling of the community wells, will help ensure the long-term protectiveness of the existing remedy.

Secondly, as documented in the ROD and discussed in the previous five-year review, contaminated groundwater in the shallow aquifer has migrated off-site into the area beneath Highway M-59, due in part to the geological conditions near the highway median (i.e., loose, gravelly soil). The potential for further off-site migration could increase should Highland Township perform construction of sewer lines and place additional loose materials (such as gravel or sand) below-grade along the highway. Should this type of construction occur, the potential for dermal contact with shallow groundwater by off-site workers could be introduced.

When the Site risk assessment was conducted, the only exposure pathway evaluated related to on-site workers was ingestion of on-site surface soils. The assessment indicated that current on-site workers were not at risk via the soil ingestion pathway. Possible current worker exposure to Site groundwater was not evaluated at the time of the RI because there was no indication that workers (i.e., at the facility) were exposed to the shallow groundwater at the Site. The identification of a DNAPL on-site, which is a continuing source of groundwater contamination, and the significant increase in VOC concentrations (in particular TCE) since the time of the RI, are additional circumstances that differ from those present when the ROD was signed in 1993. As discussed in the previous five-year review, the highest on-site concentration of TCE detected since O&M began is approximately 35 times greater than the highest on-site concentration detected during the RI. Given the high

concentrations of TCE in the shallow groundwater on-site, the Agencies need to determine whether any additional follow-up activities are needed, beyond the indoor air sampling conducted by CRA in May 2005, to address the vapor intrusion pathway.

Finally, it is recommended that the monitoring well network and sampling regimen be re-evaluated and revised to include sampling of the new monitoring wells and nearby community wells, and to make the sampling more efficient. Such a revised groundwater monitoring program will provide additional information about groundwater conditions and will help ensure long-term protectiveness at the Site.

## VIII. Issues

**Table 4 – Issues**

<b>Issues</b>	<b>Affects Current Protectiveness</b>	<b>Affects Future Protectiveness</b>
The intermediate aquifer requires additional sampling to better assess current groundwater conditions at the Site.	No	Yes
There remains a future concern for the potential that contaminated groundwater from the Site could impact the Wellhead Protection Area for two community wells west of the Site.	No	Yes
To ensure the ICs remain effective, IC requirements need to be further evaluated and an IC Plan developed. The IC plan should take into consideration potential construction along State Highway M-59 and impacts to future workers.	No	Yes
The Agencies need to determine whether any additional follow-up activities are needed to address the vapor intrusion pathway for on-site workers.	No	Yes

## IX. Recommendations and Follow-Up Actions

**Table 5 - Recommendations and Follow-Up Actions**

<b>Issue</b>	<b>Recommendations and Follow-Up Actions</b>	<b>Party Responsible</b>	<b>Oversight Agency</b>	<b>Milestone Date</b>	<b>Affects Protectiveness?</b>	
					<b>Current</b>	<b>Future</b>
The intermediate aquifer requires additional sampling to better assess current groundwater conditions at the Site.	The groundwater monitoring program for the Site needs to be revisited and a revised sampling regimen implemented. The regimen should include the newly constructed intermediate monitoring wells at the Site.	PRP	USEPA and MDNRE	December 2010	No	Yes

Issue	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness?	
					Current	Future
There remains a concern for the potential that contaminated groundwater from the Site could impact the Wellhead Protection Area for two community wells west of the Site.	Sampling of the community well(s) within the Wellhead Protection Area that potentially intersects the Site groundwater contamination plume needs to be conducted.	PRP	USEPA and MDNRE	December 2010	No	Yes
To ensure the ICs remain effective, IC requirements need to be evaluated and an IC Plan developed. The IC Plan should take into consideration potential construction along State Highway M-59 and impacts to future workers.	An IC evaluation for the Site needs to be completed. An IC Plan needs to be developed documenting IC activities and planning corrective measures needed to ensure long-term protectiveness.	PRP	USEPA and MDNRE	March 2011	No	Yes
The Agencies need to determine whether any additional follow-up activities are needed to address the vapor intrusion pathway for on-site workers.	Evaluate whether any additional follow-up activities are needed, beyond the indoor air sampling conducted by CRA in 2005, to address the vapor intrusion pathway.	USEPA	MDNRE	March 2011	No	Yes

## **X. Protectiveness Statement**

The assessment of this five-year review for the Hi-Mill Manufacturing Company Site found that the remedy is protective of human health and the environment in the short term. Based on the site inspection, monitoring data and communication with O&M personnel, no inappropriate land or groundwater use was observed. USEPA is not aware of site or media uses which are inconsistent with the stated objectives of the ICs for the Site. Groundwater monitoring will continue so that USEPA and MDNRE can be sure that the remedy remains protective of human health and the environment. There are some issues that impact long-term protectiveness at the Site. The groundwater monitoring program needs to be revisited and a revised sampling regimen implemented that includes the newer intermediate monitoring wells. There also remains a concern for the potential that contaminated groundwater emanating from the Site may intersect with the Wellhead Protection Area for

the two community wells west of the Site in the future. As a precautionary measure, sampling of the community wells should also be performed to confirm that the Wellhead Protection Area is not impacted by the Site. In addition, long-term protectiveness at the Site requires continued compliance with use restrictions to assure that the remedy continues to function as intended. To assure proper maintenance, monitoring, and enforcement of effective ICs, long-term stewardship procedures will be reviewed and a plan developed. This plan will include a provision for regular inspection of ICs at the Site and annual certification to USEPA that the ICs are in place and effective. The institutional controls for the Site should be consistent with model restrictive covenant language. Finally, to ensure that future construction workers are protected from off-site groundwater migration into areas near Highway M-59, the adequacy of the remedy and the ICs for the Site should be re-evaluated to determine if additional response is needed.

## **XI. Next Review**

The next five-year review will be completed within five years from the signature date of this review.

## Figures



# Hi-Mill Manufacturing Company Superfund Site, Michigan

## 1) State



## 2) Oakland County



## 3) Hi-Mill Site



Figure 1

DRAFT

APPROVED:

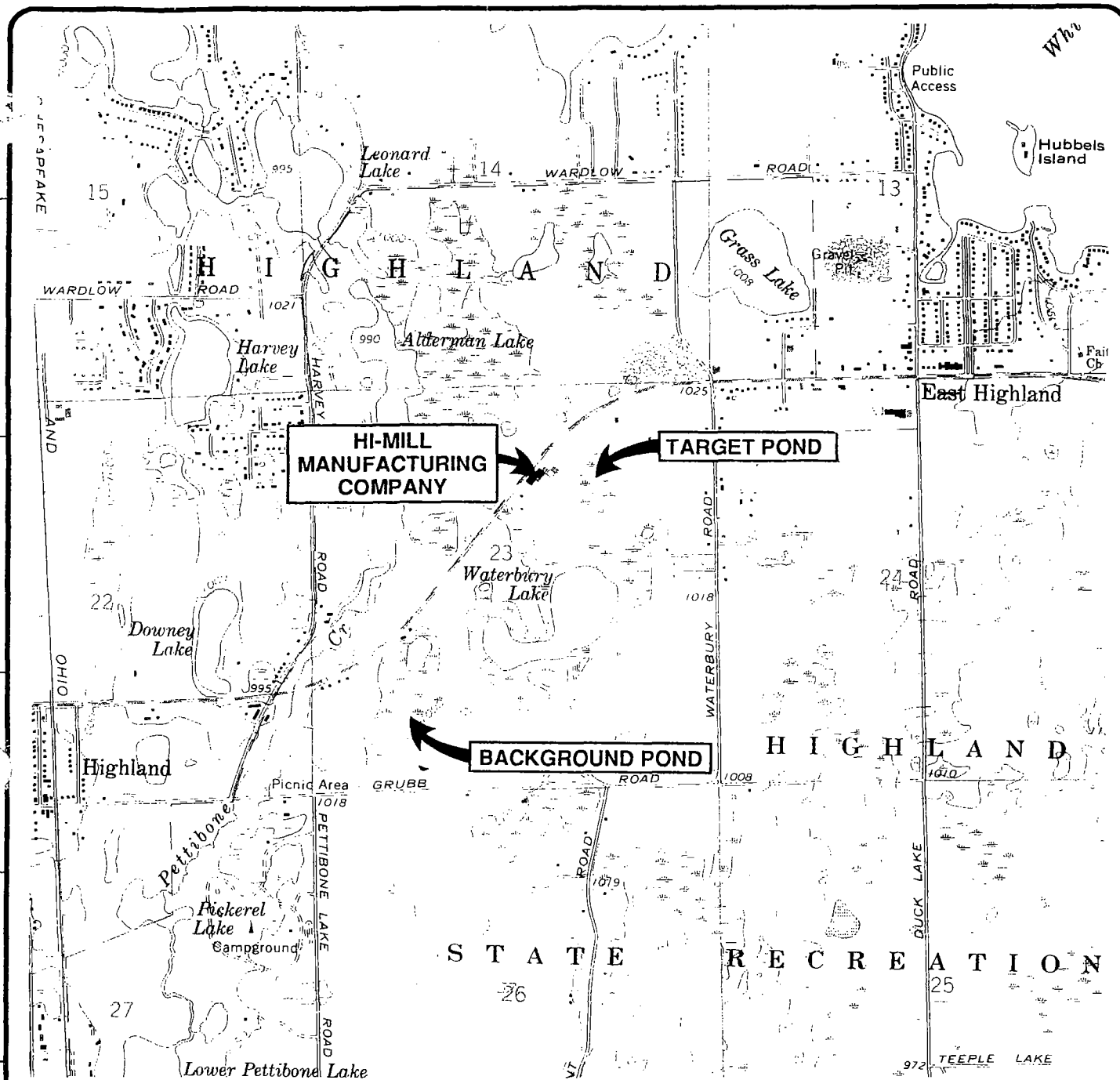
CHECKED: SE

DRAWING:

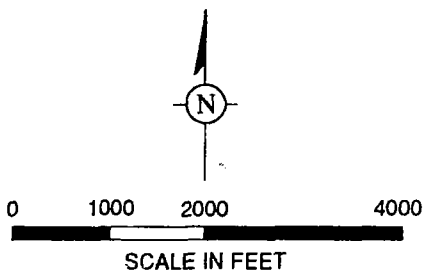
FILE NO.: 0144

PROJECT NO.: M1135.04

DATE: 20APR92



SOURCE: USGS 7.5 Minute Topographic Map, HIGHLAND, MICHIGAN Quadrangle, 1983



## SITE LOCATION

HI-MILL MANUFACTURING COM  
HIGHLAND, MICHIGAN

# Figure 2

**Attachment 1**  
**Deed Restrictions**


Dec 22 1994

DEED RESTRICTIONS ON HI-MILL MANUFACTURING CO. SITE

Hi-Mill Manufacturing Company, owner in fee simple of the real estate described in Attachment 1, hereby imposes restrictions on the described real estate, also known as the Hi-Mill Manufacturing Company Site (hereinafter "the Site") in Highland, Oakland County, State of Michigan.

The following restrictions are imposed upon the Site, its present and any future owners, their authorized agents, assigns, employees or persons acting under their direction or control, for the purposes of protecting public health or welfare and the environment, preventing interference with the performance, and the maintenance, of any response actions selected and/or undertaken by the United States Environmental Protection Agency ("U.S. EPA"), or any party acting as agent for U.S. EPA, pursuant to Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"). Specifically, the following deed restrictions shall apply to the Site as provided for in paragraph nine (9) of the Consent Decree:

22 DEC 94 1:14 P.M. RECEIPT# 132  
PAID \$11.00 MISCELLANEOUS RECORDING  
\$2.00 REMUNERATION  
RECORDED OAKLAND COUNTY  
LYNN D. ALLEN, CLERK/REGISTER OF DEED

- 
1. There shall be no consumptive or other use of the shallow groundwater unit underlying the Site that could cause exposure of humans or animals to the shallow groundwater unit underlying the Site;
  2. There shall be no residential or agricultural use of the Site, including, but not limited to, any installation of drinking water production wells in the shallow groundwater unit, except as approved by U.S. EPA. Further, there shall be no excavation beneath the paved parking areas at the Site.
  3. There shall be no tampering with, or removal of, the containment or monitoring systems that remain on the Site as a result of implementation of any response action by U.S. EPA, or any party acting as agent for U.S. EPA, and which is selected and/or undertaken by U.S. EPA pursuant to Section 104 of CERCLA; and
  4. There shall be no use of, or activity at, the Site that may interfere with, damage, or otherwise impair the effectiveness of any response action (or component thereof) selected and/or undertaken by U.S. EPA, pursuant to Section 104 of CERCLA, except with written approval of U.S. EPA, and consistent with all statutory and regulatory requirements.
- 11/80  
X 2

The above use restrictions are intended for the protection of public health and the environment and may therefore be enforced by the U.S. EPA or the State of Michigan. The obligation to implement and maintain the above restrictions shall run with the land and shall remain in effect permanently,

O.K. - J.S.

unless and until such time as U.S. EPA determines there is no longer contamination on the Site.

IN WITNESS WHEREOF, Robert Beard has caused these Deed Restrictions to be executed this 22nd day of December, 1994.

FOR HI-MILL MANUFACTURING COMPANY

BY: Robert F. Beard  
Robert F. Beard

Witnesseth:

Denise Russette  
WITNESS Denise Russette

Clairine J. Kelley  
WITNESS CLAIRINE J. KELLEY

STATE OF MICHIGAN  
COUNTY OF MACOMB

Subscribed and sworn to before me this 22nd Day of December, 1994 by Robert F. Beard

Denise M. Russette  
Denise M. Russette  
Macomb County, Michigan  
my Commission expires: 5/26/96

Drafted by and when recorded  
return to:  
Butzel Long  
By Richard Beard  
Robert Beard  
150 W. Jefferson  
Detroit, MI 48206-4430  
Denise Russette



LISE 15165 PG 755

ATTACHMENT 1

LEGAL DESCRIPTION

Town 3 North, Range 7 East, Section 23

That part of the Southwest 1/4 of the Northwest 1/4 of the Northeast 1/4 of Section lying Southeasterly of M-59 highway, Also that part of Southwest 1/4 of Northeast 1/4 of Section described as beginning at intersection of North line of Southwest 1/4 of Northeast 1/4 with Southeasterly right of way line of M-59 Highway, thence South 40 degrees 51 minutes 18 seconds West 100 feet, thence South 49 degrees 8 minutes 42 seconds East 250 feet, thence North 40 degrees 51 minutes 18 seconds East 305 feet, thence West along North line of Southwest 1/4 of Northeast 1/4 to beginning.

HIGHLAND

11-23-202-003

NE 1/4

## **Attachment 2**

### **Public Note**



## **EPA Begins Review of Hi-Mill Manufacturing Co. Superfund site Oakland County, Michigan**

U. S. Environmental Protection Agency is conducting a five-year review of the Hi-Mill Manufacturing Co. Superfund site located approximately 30 miles northwest of Detroit, at 1704 Highland Rd. (State Highway M-59) in Highland Township. M-59 forms the northwestern border of the site. The other three sides are adjacent to the Highland State Recreation Area. The Superfund law requires regular checkups of sites that have been cleaned up – with waste managed on-site – to make sure the cleanup continues to protect people and the environment. This is the third five-year review of this site.

EPA's cleanup of this site consisted of developing institutional controls to restrict excavation in the highway median and to determine whether the current site deed restrictions are effective and legally enforceable. The cleanup plan called for modifications to the restrictions if necessary. In addition, sampling of municipal wells that potentially intersect the Hi-Mill ground water (underground water) plume will also happen. If the well data indicates additional work, information would be sent to both federal and state departments within three months of receipt.

More information is available at the Highland Township Library, 205 W. Livingston St., Highland. The review should be completed by the summer of 2010.

The five-year review is an opportunity for you to tell EPA about site conditions and any concerns you have. Contact:

**Linda Kern**  
Remedial Project Manager  
312-886-7341  
kern.linda@epa.gov

**Robert Paulson**  
Community Involvement Coordinator  
312-886-0272  
paulson.robert@epa.gov

You may also call Region 5 toll-free at 800-621-8431,  
9:30 a.m. to 5:30 p.m., weekdays  
**EPA Region 5 (SI-6J)**  
77 W. Jackson Blvd.  
Chicago, IL 60604

[www.theoaklandpress.com](http://www.theoaklandpress.com)

**OAKLAND COUNTY**

THURSDAY FEBRUARY 25 2010

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### **Attachment 3**

#### **Site Inspection Report and Site Photographs**

## Site Inspection Checklist

I. SITE INFORMATION	
Site name: <u>H. MILL MFG.</u>	Date of inspection: <u>6/29/10</u>
Location and Region: <u>HIGHLAND TOWNSHIP, MI</u>	EPA ID: <u>MI8005341714</u>
Agency, office, or company leading the five-year review: <u>USEPA</u>	Weather/temperature: <u>Sunny 260°F</u>
<b>Remedy Includes:</b> (Check all that apply) <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> Landfill cover/containment  <input type="checkbox"/> Access controls  <input checked="" type="checkbox"/> Institutional controls  <input type="checkbox"/> Groundwater pump and treatment  <input type="checkbox"/> Surface water collection and treatment  <input checked="" type="checkbox"/> Other <u>GROUNDWATER MONITORING</u> </div> <div style="width: 50%;"> <input type="checkbox"/> Monitored natural attenuation  <input type="checkbox"/> Groundwater containment  <input type="checkbox"/> Vertical barrier walls           </div> </div>	
<b>Attachments:</b> <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager <u>JIM CLARKE</u> <u>MANAGER H. MILL</u> <u>6/29/10</u> <div style="display: flex; justify-content: space-between; font-size: small;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone   Phone no. <u>248-887-4191</u> Problems, suggestions; <input type="checkbox"/> Report attached <u>PROVIDED AGENCY PERSONNEL TOUR OF FACILITY</u>	
2. O&M staff _____ <div style="display: flex; justify-content: space-between; font-size: small;"> <span>Name</span> <span>Title</span> <span>Date</span> </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone   Phone no. _____ Problems, suggestions; <input type="checkbox"/> Report attached _____	

- Agency MICHIGAN DURE  
Contact AUTUMN LAWSON PROJECT MGR. 6/29/10 517/241-2120  
Name Title Date Phone no.  
Problems; suggestions; O Report attached INCORPORATED COMMENTS INTO REPORT
- 
- Agency MICHIGAN DURE  
Contact BILL BOULO HYDROGEOLOGIST 6/29/10 517/241-2100  
Name Title Date Phone no.  
Problems; suggestions; O Report attached INCORPORATED COMMENTS INTO REPORT
- 
- Agency \_\_\_\_\_  
Contact \_\_\_\_\_  
Name Title Date Phone no.  
Problems; suggestions; O Report attached \_\_\_\_\_
- 
- Agency \_\_\_\_\_  
Contact \_\_\_\_\_  
Name Title Date Phone no.  
Problems; suggestions; O Report attached \_\_\_\_\_

- 
- This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

### III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1.	<b>O&amp;M Documents</b> <input type="checkbox"/> O&M manual <input type="checkbox"/> As-built drawings <input type="checkbox"/> Maintenance logs Remarks _____	<input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A
2.	<b>Site-Specific Health and Safety Plan</b> <input type="checkbox"/> Contingency plan/emergency response plan Remarks _____	<input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input type="checkbox"/> N/A <input type="checkbox"/> N/A
3.	<b>O&amp;M and OSHA Training Records</b> Remarks _____	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
4.	<b>Permits and Service Agreements</b> <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits _____ Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
5.	<b>Gas Generation Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
6.	<b>Settlement Monument Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
7.	<b>Groundwater Monitoring Records</b> Remarks _____	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
8.	<b>Leachate Extraction Records</b> Remarks _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
9.	<b>Discharge Compliance Records</b> <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent) Remarks _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A
10.	<b>Daily Access/Security Logs</b> Remarks _____	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A

#### IV. O&M COSTS

1. **O&M Organization**

- ☐ State in-house                      ☐ Contractor for State  
☐ PRP in-house                      ☒ Contractor for PRP  
☐ Federal Facility in-house           ☐ Contractor for Federal Facility  
☐ Other \_\_\_\_\_

2. **O&M Cost Records**

- ☒ Readily available           ☐ Up to date  
☐ Funding mechanism/agreement in place  
Original O&M cost estimate \_\_\_\_\_ ☐ Breakdown attached

Total annual cost by year for review period if available

From _____	To _____	_____	<input type="radio"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="radio"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="radio"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="radio"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="radio"/> Breakdown attached
Date	Date	Total cost	

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: N/A

#### V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☐ N/A

**A. Fencing**

1. **Fencing damaged**           ☐ Location shown on site map   ☒ Gates secured   ☐ N/A  
Remarks \_\_\_\_\_

**B. Other Access Restrictions**

1. **Signs and other security measures**           ☐ Location shown on site map   ☒ N/A  
Remarks \_\_\_\_\_

**C. Institutional Controls (ICs)****1. Implementation and enforcement**

Site conditions imply ICs not properly implemented

☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced

☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by) \_\_\_\_\_

Frequency \_\_\_\_\_

Responsible party/agency \_\_\_\_\_

Contact JAMIE BUSKIS \_\_\_\_\_

Name

Title

Date Phone no.

Reporting is up-to-date

☐ Yes ☐ No ☐ N/A

Reports are verified by the lead agency

☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met

☐ Yes ☐ No ☐ N/A

Violations have been reported

☐ Yes ☐ No ☐ N/AOther problems or suggestions: ☐ Report attached**2. Adequacy**☒ ICs are adequate☐ ICs are inadequate☐ N/A

Remarks \_\_\_\_\_

**D. General****1. Vandalism/trespassing**☐ Location shown on site map☒ No vandalism evident

Remarks \_\_\_\_\_

**2. Land use changes on site**☒ N/A

Remarks \_\_\_\_\_

**3. Land use changes off site**☒ N/A

Remarks \_\_\_\_\_

**VI. GENERAL SITE CONDITIONS****A. Roads**☐ Applicable☒ N/A**1. Roads damaged**☐ Location shown on site map☐ Roads adequate ☐ N/A

Remarks \_\_\_\_\_

**B. Other Site Conditions**Remarks \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_**VII. LANDFILL COVERS**    ☐ Applicable    ☒ N/A**A. Landfill Surface**

1.     **Settlement** (Low spots)                      ☐ Location shown on site map                      ☐ Settlement not evident  
Areal extent \_\_\_\_\_                      Depth \_\_\_\_\_  
Remarks \_\_\_\_\_  
\_\_\_\_\_

2.     **Cracks**    ☐ Location shown on site map                      ☐ Cracking not evident  
Lengths \_\_\_\_\_                      Widths \_\_\_\_\_                      Depths \_\_\_\_\_  
Remarks \_\_\_\_\_  
\_\_\_\_\_

3.     **Erosion**    ☐ Location shown on site map                      ☐ Erosion not evident  
Areal extent \_\_\_\_\_                      Depth \_\_\_\_\_  
Remarks \_\_\_\_\_  
\_\_\_\_\_

4.     **Holes**    ☐ Location shown on site map                      ☐ Holes not evident  
Areal extent \_\_\_\_\_                      Depth \_\_\_\_\_  
Remarks \_\_\_\_\_  
\_\_\_\_\_

5.     **Vegetative Cover**                      ☐ Grass                      ☐ Cover properly established                      ☐ No signs of stress  
☐ Trees/Shrubs (indicate size and locations on a diagram)  
Remarks \_\_\_\_\_  
\_\_\_\_\_

6.     **Alternative Cover (armored rock, concrete, etc.)**                      ☐ N/A  
Remarks \_\_\_\_\_  
\_\_\_\_\_

7.     **Bulges**    ☐ Location shown on site map                      ☐ Bulges not evident  
Areal extent \_\_\_\_\_                      Height \_\_\_\_\_  
Remarks \_\_\_\_\_  
\_\_\_\_\_

8.     **Wet Areas/Water Damage**                      ☐ Wet areas/water damage not evident  
☐ Wet areas                      ☐ Location shown on site map                      Areal extent \_\_\_\_\_  
☐ Ponding                      ☐ Location shown on site map                      Areal extent \_\_\_\_\_  
☐ Seeps                      ☐ Location shown on site map                      Areal extent \_\_\_\_\_  
☐ Soft subgrade                      ☐ Location shown on site map                      Areal extent \_\_\_\_\_  
Remarks \_\_\_\_\_  
\_\_\_\_\_

9.	<b>Slope Instability</b>	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of slope instability
	Areal extent _____			
	Remarks _____			
<b>B. Benches</b>				
	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A		
	(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	<b>Flows Bypass Bench</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
	Remarks _____			
2.	<b>Bench Breached</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
	Remarks _____			
3.	<b>Bench Overtopped</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay	
	Remarks _____			
<b>C. Letdown Channels</b>				
	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A		
	(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1.	<b>Settlement</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement	
	Areal extent _____	Depth _____		
	Remarks _____			
2.	<b>Material Degradation</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation	
	Material type _____	Areal extent _____		
	Remarks _____			
3.	<b>Erosion</b>	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion	
	Areal extent _____	Depth _____		
	Remarks _____			



4.	<b>Undercutting</b> Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map Depth _____	<input type="checkbox"/> No evidence of undercutting
5.	<b>Obstructions</b> Type _____ <input type="checkbox"/> Location shown on site map    Areal extent _____ Size _____ Remarks _____	<input type="checkbox"/> No obstructions	
6.	<b>Excessive Vegetative Growth</b> Type _____ <input type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map    Areal extent _____ Remarks _____		
<b>D. Cover Penetrations</b> <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.	<b>Gas Vents</b> <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> N/A Remarks _____	<input type="checkbox"/> Active <input type="checkbox"/> Passive <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> Good condition
2.	<b>Gas Monitoring Probes</b> <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> Good condition <input type="checkbox"/> N/A
3.	<b>Monitoring Wells (within surface area of landfill)</b> <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> Good condition <input type="checkbox"/> N/A
4.	<b>Leachate Extraction Wells</b> <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Evidence of leakage at penetration Remarks _____	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Needs Maintenance	<input type="checkbox"/> Good condition <input type="checkbox"/> N/A
5.	<b>Settlement Monuments</b> Remarks _____	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A

<b>E. Gas Collection and Treatment</b>			<input type="radio"/> Applicable <input checked="" type="radio"/> N/A
1.	<b>Gas Treatment Facilities</b> <input type="radio"/> Flaring <input type="radio"/> Thermal destruction <input type="radio"/> Collection for reuse <input type="radio"/> Good condition <input type="radio"/> Needs Maintenance Remarks _____		
2.	<b>Gas Collection Wells, Manifolds and Piping</b> <input type="radio"/> Good condition <input type="radio"/> Needs Maintenance Remarks _____		
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings) <input type="radio"/> Good condition <input type="radio"/> Needs Maintenance <input type="radio"/> N/A Remarks _____		
<b>F. Cover Drainage Layer</b>			<input type="radio"/> Applicable <input checked="" type="radio"/> N/A
1.	<b>Outlet Pipes Inspected</b>	<input type="radio"/> Functioning	<input type="radio"/> N/A
Remarks _____			
2.	<b>Outlet Rock Inspected</b>	<input type="radio"/> Functioning	<input type="radio"/> N/A
Remarks _____			
<b>G. Detention/Sedimentation Ponds</b>			<input type="radio"/> Applicable <input checked="" type="radio"/> N/A
1.	<b>Siltation</b> Areal extent _____	Depth _____	<input type="radio"/> N/A
<input type="radio"/> Siltation not evident			
Remarks _____			
2.	<b>Erosion</b> Areal extent _____	Depth _____	
<input type="radio"/> Erosion not evident			
Remarks _____			
3.	<b>Outlet Works</b>	<input type="radio"/> Functioning	<input type="radio"/> N/A
Remarks _____			
4.	<b>Dam</b>	<input type="radio"/> Functioning	<input type="radio"/> N/A
Remarks _____			

<b>H. Retaining Walls</b>		<input type="radio"/> Applicable	<input checked="" type="radio"/> N/A
1.	<b>Deformations</b>	<input type="radio"/> Location shown on site map	<input type="radio"/> Deformation not evident
	Horizontal displacement _____	Vertical displacement _____	
	Rotational displacement _____		
	Remarks _____		
2.	<b>Degradation</b>	<input type="radio"/> Location shown on site map	<input type="radio"/> Degradation not evident
	Remarks _____		
<b>I. Perimeter Ditches/Off-Site Discharge</b>		<input type="radio"/> Applicable	<input checked="" type="radio"/> N/A
1.	<b>Siltation</b>	<input type="radio"/> Location shown on site map	<input type="radio"/> Siltation not evident
	Areal extent _____	Depth _____	
	Remarks _____		
2.	<b>Vegetative Growth</b>	<input type="radio"/> Location shown on site map	<input type="radio"/> N/A
	Vegetation does not impede flow		
	Areal extent _____	Type _____	
	Remarks _____		
	<b>Erosion</b>	<input type="radio"/> Location shown on site map	<input type="radio"/> Erosion not evident
	Areal extent _____	Depth _____	
	Remarks _____		
4.	<b>Discharge Structure</b>	<input type="radio"/> Functioning	<input type="radio"/> N/A
	Remarks _____		
<b>VIII. VERTICAL BARRIER WALLS</b>		<input type="radio"/> Applicable	<input checked="" type="radio"/> N/A
1.	<b>Settlement</b>	<input type="radio"/> Location shown on site map	<input type="radio"/> Settlement not evident
	Areal extent _____	Depth _____	
	Remarks _____		
2.	<b>Performance Monitoring</b>	Type of monitoring _____	
	<input type="radio"/> Performance not monitored		
	Frequency _____	<input type="radio"/> Evidence of breaching	
	Head differential _____		
	Remarks _____		

<b>C. Treatment System</b>		<input type="radio"/> Applicable	<input checked="" type="radio"/> N/A
1.	<b>Treatment Train</b> (Check components that apply) <input type="radio"/> Metals removal <input type="radio"/> Oil/water separation <input type="radio"/> Bioremediation <input type="radio"/> Air stripping <input type="radio"/> Carbon adsorbers <input type="radio"/> Filters _____ <input type="radio"/> Additive (e.g., chelation agent, flocculent) _____ <input type="radio"/> Others _____ <input type="radio"/> Good condition <input type="radio"/> Needs Maintenance <input type="radio"/> Sampling ports properly marked and functional <input type="radio"/> Sampling/maintenance log displayed and up to date <input type="radio"/> Equipment properly identified <input type="radio"/> Quantity of groundwater treated annually _____ <input type="radio"/> Quantity of surface water treated annually _____ Remarks _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) <input type="radio"/> N/A <input type="radio"/> Good condition <input type="radio"/> Needs Maintenance Remarks _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> <input type="radio"/> N/A <input type="radio"/> Good condition <input type="radio"/> Proper secondary containment <input type="radio"/> Needs Maintenance Remarks _____		
4.	<b>Discharge Structure and Appurtenances</b> <input type="radio"/> N/A <input type="radio"/> Good condition <input type="radio"/> Needs Maintenance Remarks _____		
5.	<b>Treatment Building(s)</b> <input type="radio"/> N/A <input type="radio"/> Good condition (esp. roof and doorways) <input type="radio"/> Needs repair <input type="radio"/> Chemicals and equipment properly stored Remarks _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy) <input type="radio"/> Properly secured/locked <input type="radio"/> Functioning <input type="radio"/> Routinely sampled <input type="radio"/> Good condition <input type="radio"/> All required wells located <input type="radio"/> Needs Maintenance <input type="radio"/> N/A Remarks _____		
<b>D. Monitoring Data</b>			
1.	Monitoring Data <input checked="" type="radio"/> Is routinely submitted on time <input type="radio"/> Is of acceptable quality		
2.	Monitoring data suggests: <u>UNDER EVALUATION - PENDING ADDITIONAL</u> <input type="radio"/> Groundwater plume is effectively contained <input type="radio"/> Contaminant concentrations are declining <u>DATA</u>		

**D. Monitored Natural Attenuation****1. Monitoring Wells (natural attenuation remedy)**

- ☐ Properly secured/locked      ☐ Functioning      ☐ Routinely sampled      ☐ Good condition  
☐ All required wells located      ☐ Needs Maintenance      ☐ N/A

Remarks \_\_\_\_\_

**X. OTHER REMEDIES**

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

**XI. OVERALL OBSERVATIONS****A. Implementation of the Remedy**

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

REMEDY @ SITE CONSISTS OF LONG-TERM  
GROUND WATER MONITORING

**B. Adequacy of O&M**

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

MAJOR COMMENTS W/RE: LABELING OF WELLS  
TO BE DISCUSSED W/ JAMIE PUSCAS

**C. Early Indicators of Potential Remedy Problems**

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

N/A

**D. Opportunities for Optimization**

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

INTEREST IN EVALUATES SOURCE CONTROL ON SITE



Photo 1: Looking north, southern side of facility with monitoring well in foreground.



Photo 2: Looking north, northern side of facility with fence in foreground.





Photo 3: Unmarked monitoring well at rear of facility.





Photo 4: Example of excessive growth surrounding monitoring well.



Photo 5: Target pond located east of facility.





Photo 6: Example of monitoring well in good condition.





Photo 7: Example of flush monitoring well in good condition



Photo 8: Example of flush monitoring well in poor condition.





Photo 9: Monitoring well (SW26A) located in meridian of Highway. At first, well appears to be locked.



Photo 10: Monitoring well (SW26A), with lock removed from well casing.





Photo 11: Example of SW-28 Monitoring well in good condition.





Photo 12: Monitoring well (IW-9) locked, but weld on casing too high to allow for proper closure



Photo 13: Cluster of monitoring well locations (IW-3, SW-3, SW-21)



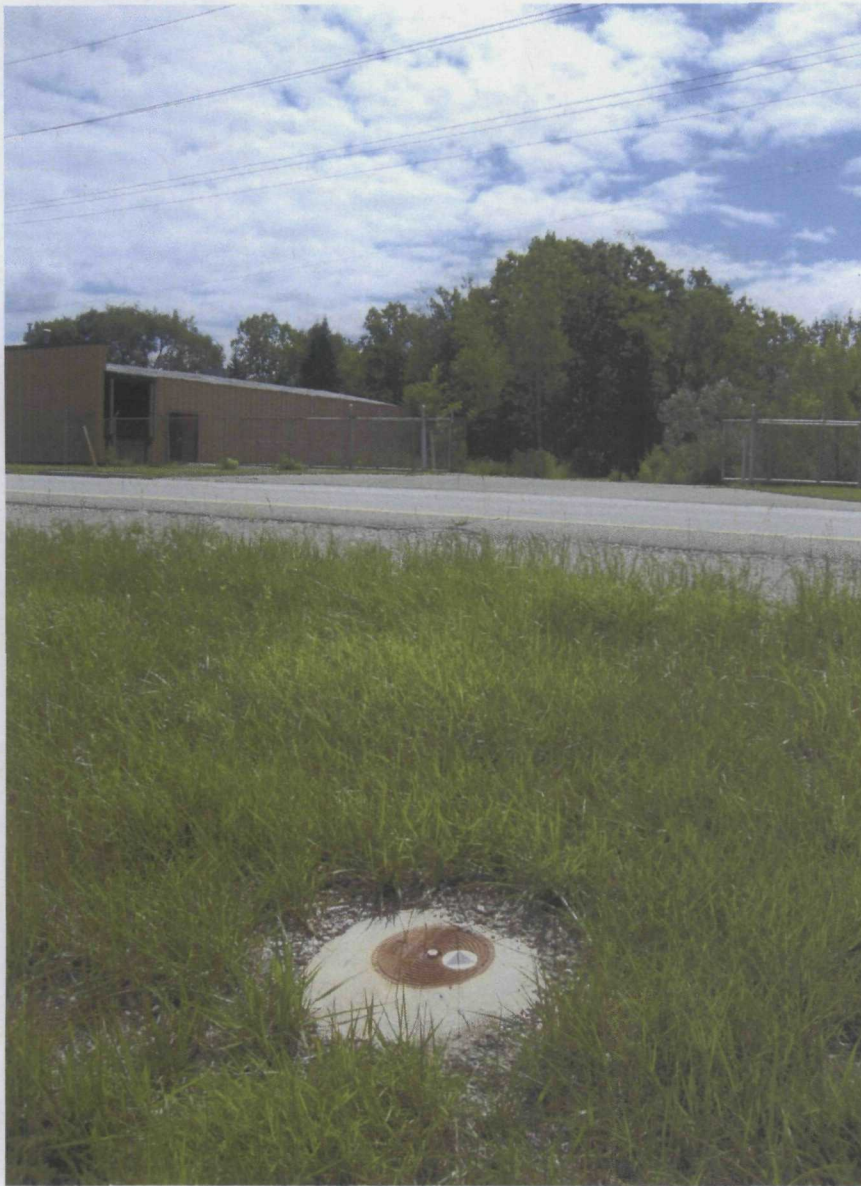


Photo 14: Location of flush mount monitoring well in meridian of Highway.